

mpg

Math 1030 #4b

ft/sec

Solving Problems with Units

ppm

Units in Real Life

\$/lb

EX 1: A city produces 500,000 cubic feet of garbage per week. If you stacked this garbage neatly on a 100-yd by 60-yd football field, how high would the garbage pile be?

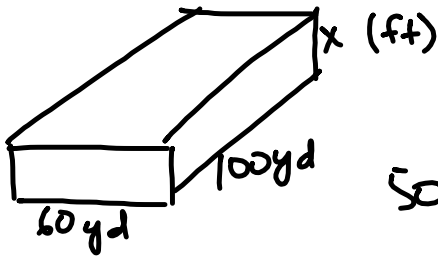
football field

$$A = (100)(60) = 6000 \text{ yd}^2$$

convert area of football field into ft^2 :

$$A = 6000 \text{ yd}^2 \left(\frac{3 \text{ ft}}{1 \text{ yd}} \right) \left(\frac{3 \text{ ft}}{1 \text{ yd}} \right)$$

area of football field = $6000(9) \text{ ft}^2 = 54000 \text{ ft}^2$



volume of garbage:

$$500,000 \text{ ft}^3 = \text{area of base} \times \text{ht of box}$$

$$500000 = 54000x$$

$$x = \frac{500,000}{54,000} \approx 9.26 \text{ ft}$$

\Rightarrow ht of garbage pile is 9.26 ft.

Density and Concentration

Material density -- mass per volume

Cork has a density of 240 kg/m^3

Gold has a density of $19,320 \text{ kg/m}^3$

Population density -- people per area

Utah has 35.3 P/mi^2

DC has $10,589 \text{ P/mi}^2$

Information density -- storage space per area

Concentration of air pollutant -- molecules of pollutant per million molecules of air (PPM)

44 PPM of Nitrates are allowable for standard drinking water.

Blood alcohol content (BAC) -- grams of alcohol per 100 ml of blood

EX 2:

Eight ounces of hard liquor contains about 70 grams of alcohol. A 200 lb man (about 5500 ml of blood) quickly drinks 3 oz of hard liquor. If all the alcohol is immediately absorbed to his blood stream, what would his blood alcohol content be?

$$\frac{3 \text{ oz liquor}}{5500 \text{ ml blood}} \left(\frac{70 \text{ g alcohol}}{8 \text{ oz liquor}} \right)$$
$$= \frac{210}{8(55)} \left(\frac{\text{g}}{100 \text{ ml}} \right) \approx 0.48 \text{ g/100ml}$$